

SEASONAL VARIATIONS IN MYZOCALLIS
CALIFORNICUS BAKER

(Aphididae)

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In a previous paper I gave as my opinion that *Myzocallis maureri* Swain was probably not a synonym of *Myzocallis californicus* Baker. Since that time, through the kindness of Professor E. O. Essig I have had the opportunity to study the type and several cotypes of *M. maureri* now in his collection, and a long series of slides also from his collection, determined either as *californicus* or *maureri*. I have also seen the type slide of *M. californicus* Baker which is now in the U. S. National Museum.

Aphid workers may find of interest the data which leads me to believe that we are dealing with a single species which produces seasonal variations.

What the factors are that produce these seasonal changes and their manner of action must await experimentation. One quite naturally suspects temperature and moisture as being primary, but whether they act alone, or associated, direct or indirectly through the host, will have to be determined.

M. californicus was described from material collected by Davidson at Walnut Creek, California, April 6, 1916. The type and cotype material of *M. maureri* was collected by Swain at Berkeley, California, during June and July, 1915. If one were to base an opinion on a study of the type material alone, he would have to conclude that the two forms are distinct. One would reach a similar conclusion from a study of material collected in the vicinity of Berkeley before the middle of April or after the middle of June. The form from which *californicus* was described is characteristic of specimens taken in early spring. It differs from the form *maureri* which is characteristic of specimens taken in summer.

In the vicinity of Berkeley specimens characteristic of the species described as *californicus* by Baker may be taken up to the latter part of April in most years. Such specimens differ from the summer form *maureri* in having a larger number of secondary sensoria on the third antennal segment, a longer anal vein, in the shape of the radial sector, the length of the radial sector, and in the angle by which the radial sector meets the margin of the wing.

The transition from the forms characteristic of spring to the forms characteristic of summer is not abrupt, but is marked by the advent of intermediate forms. Taken alone these intermediate forms are difficult to place specifically, and it is not surprising that in the past some of these have been determined as *californicus* while others have been determined as *maureri*. The intermediate forms as a rule have fewer secondary sensoria than the spring forms but more than the summer forms, their anal veins are intermediate and the shape and length of the radial sector and the angle by which it meets the margin of the wing is also intermediate. There is a surprising correlation between the number of secondary sensoria and the length of the radial sector, the shorter the radial sector the fewer the secondary sensoria.

In the vicinity of Berkeley intermediate forms appear the latter part of April and continue present until the fore part of June. It is interesting to note the influence of altitude, which most likely plays a part because it influences other factors, which in turn bring about the seasonal variations. By chance the specimens on three slides were collected in Yosemite National Park, California. In Yosemite the type characteristic of spring was taken on May 15th, the intermediate form on July 6th, and the summer form on

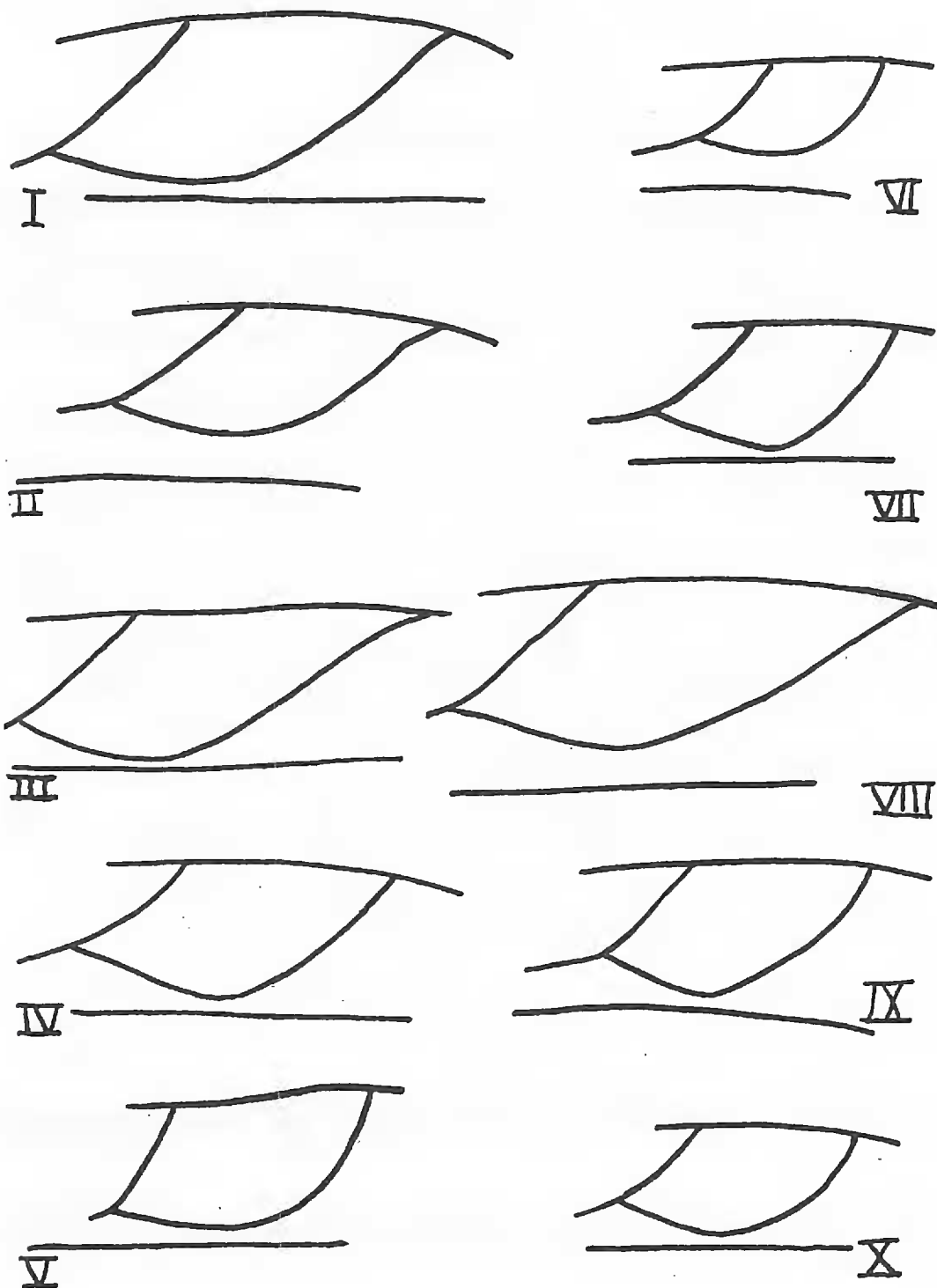
Figures I - X. Variations in wing veins of *Myzocallis californica* Baker. In each case the line under the radial sector represents the relative length of the anal vein. All drawings were projected, hence are to the same scale. It should be noted that while all specimens fit the general scheme that not all were taken in the same locality or year, hence are strictly speaking not as desirable from the standpoint of comparison as they might be.

Fig. I. Specimen taken at Berkeley April 6, 1916, six to eight sensoria. Typical of early spring form. Fig. II. Specimen taken at Berkeley May 3, 1916. Six sensoria. An intermediate form. Fig. III. Specimen taken at San Francisco, May 4, 1930. Six to seven sensoria. A spring form. Fig. IV. Specimen taken at Berkeley April 14, 1916. Seven sensoria. An intermediate form. Fig. V. Cotype of *maureri* Berkeley, June 8, 1915. Five sensoria. A summer form. Fig. VI. Specimen taken at Berkeley June 21, 1916. Three sensoria. An extreme form. Fig. VII. Specimen taken from type slide of *maureri*, Berkeley, July 24, 1915. A summer form. Four sensoria. Fig. VIII. Specimen taken at Yosemite National Park June 9, 1928. A spring form. Six to eight sensoria. Fig. IX. Specimen taken at Yosemite National Park July 6, 1939. (Research Reserve). Seven to nine sensoria. An intermediate form. Fig. X. Specimen taken at Yosemite National Park July 15, 1939. (Miguel Meadow). A summer form. Head absent.

July 15th, roughly a month later in each case than corresponding forms were taken in Berkeley.

It would appear that the name *maureri* should be retained for a seasonal form of *Myzocallis californicus* Baker.

Myzocallis tonkawa Hottes is a related species. It is known only from Colorado. It does not produce seasonal variations. If its sexual forms did not differ from those of *californicus* it might be considered a variety of that species, and come into the seasonal variations ahead of the spring forms of *californicus*, for it has a longer anal vein; a longer radial sector, and more secondary sensoria than does that species.



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 CULICOIDES SPINOSUS IN OKLAHOMA

(Diptera: Heleidae)

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Culicoides spinosus was originally described by Root and Hoffman¹ from males taken at lights at Baltimore, Maryland. In that locality it was taken with *C. piliferus* Root and Hoffman, a species which was said to be closely similar to *C. spinosus* and, therefore, prevented the differentiation of females of the two species.

C. spinosus was isolated by the present writer at Shattuck, Oklahoma, from light trap collections (1948). The male genitalia differs from the diagram presented by Root and Hoffman in that the tip of the aedeagus is shorter and more truncate; the stem of harpes is almost the same width throughout; the bulb, at the base, is usually not distinct; and, usually, the inner processes of the side piece do not look that approximate in the whole view of the genitalia.

The accompanying female is superficially similar to *C. simulans* Root and Hoffman. Both are of about the same size and general appearance. The mesonotum of *C. spinosus* is brownish, with a grayish pubescence present in the form of two submedian stripes and two areas on each side, one in front and one behind. However, the mesonotum in general falls definitely among those without a distinct mesonotal pattern. The scutellum is brownish-gray; the halteres are whitish. The eyes are separate; the frons is brown; the antennae are lighter; the proboscis is well developed. The legs are brownish, and the knees are dark with light bands above and below.

¹Root, F. M., and W. A. Hoffman. The North American species of culicoides. American Journal of Hygiene, 25 (1):150-176, 1937.